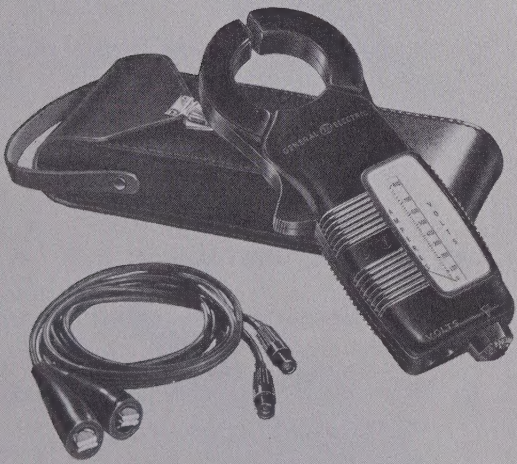
INSTRUCTIONS

GEJ-3224D

Supersedes GEJ-3224C, GEJ-2420, and GEJ-2421

TYPES AK-4 & AK-5 HOOK-ON VOLT-AMMETERS



GENERAL ELECTRIC

3 SIMPLE OPERATI

TO MEASURE CURRENT . . .

1. Turn selector knob to proper current range.
2. Open hook by pressing trigger; place hook around only the conductor to be measured.
3. Release trigger and read instrument.

TO MEASURE VOLTAGE . . .

1. Turn selector knob to proper voltage range.
2. Screw leads into instrument and connect clips to circuit.
3. Read instrument.

G STEPS . . .

INTRODUCTION

Your General Electric hook-on volt-ammeter is designed for convenient measurement of a-c voltages and currents. The hook-on feature permits measurements to be made on insulated and uninsulated circuits without any interruption of service.

The instrument has a scale-and-range-changing mechanism which provides each of the ranges with its own calibrated scale. A simple turn of the selector knob brings an entirely new scale into operation and at the same time makes the necessary internal circuit changes for the new range. An arrow molded on the case points to the range selected.

Ranges

Type	Amperes	Volts
AK-4	0-10, -30, -100, -300, -800	0-150, -300, -750
AK-5	0-5, -20, -80, -350	0-150, -300, -750

On the Type AK-4 a pointer-stop mechanism is provided which makes it possible to measure current surges (such as motor-starting currents) and voltages of short duration. This mechanism is operated by means of the red set-screw on the instrument cover.

OPERATING LIMITS

The volt-ammeter has an accuracy rating of ± 3% of full scale when used on 60-cycle circuits.

When making current measurements, maximum accuracy will be obtained if the conductor is kept as

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the General Electric Company.

close as possible to the center of the hook and the hook is fully closed.

Note: This instrument cannot be used to measure d-c voltages or currents.

Warning: Safety rules and other necessary precautions (such as keeping your hand away from any "hot" lines, etc.) must be observed when using this instrument.

The hook, although insulated when in the closed position, has a small uninsulated portion exposed when it is open. Therefore, to prevent short-circuits, keep the hook away from adjacent bare conductors or grounded surfaces.

Current measurements in circuits above 750 volts should not be made unless the conductors are adequately insulated to withstand the circuit voltages; or unless the instrument is used with an extension pole.

The instrument is sensitive to wave form; therefore, errors will be introduced when measuring other than sine-wave currents or voltages.

OPERATION

Any one of the scales may be centered in the window by turning the selector knob. A click will be "felt" when the scale is properly positioned.

Note that the voltage scales are marked in red and the current scales are marked in black.

When the approximate value of the current or voltage is not known, try the highest range first. If the indication is too small for an accurate reading, turn to a lower scale range.

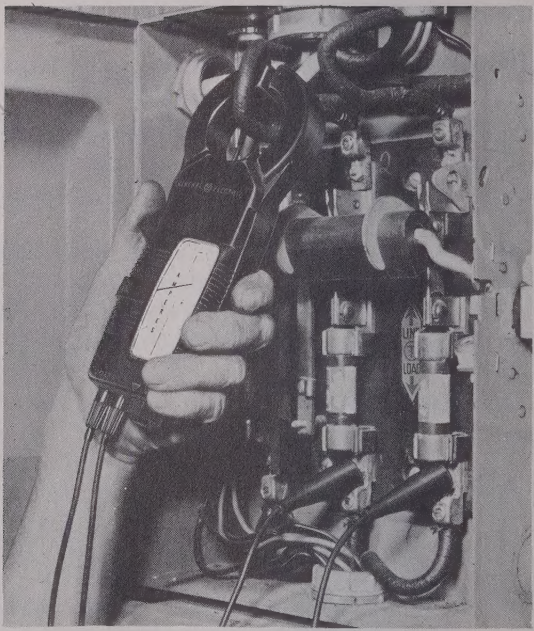


Fig. 1. Typical current and voltage measurement

For the best accuracy, the instrument pointer should be on zero before any connections are made. If an adjustment is necessary, turn the black set-screw on the instrument cover. When making this adjustment on a Type AK-4, make sure that the pointer-stop mechanism is "out of the way" (red set-screw turned to its maximum clockwise position).

CURRENT MEASUREMENTS

Current measurements with a hook-on type of instrument require that only one conductor (one "side" of the line) be placed inside of the hook. This is because the instrument operation depends on the magnetic field of the conductor which is enclosed in the hook. If both sides of the line are enclosed in the hook, the magnetic fields of the conductors will cancel, and therefore no reading will be obtained.

To Measure Current Proceed As Follows:

For low-voltage circuits (750 volts or less)

1. Turn selector knob to proper range.
2. Press trigger to open the hook and pass only the conductor to be measured inside the hook.
3. Release the trigger and make sure the hook is fully closed. Maximum accuracy will be obtained if the conductor is as close as possible to the center of the hook.
4. Read the instrument.

For high-voltage circuits (above 750 volts)

The procedure is the same as above, except that the instrument must be used with an extension pole such as the "Amertong" which is manufactured by the A. B. Chance Co., Centralia, Missouri. The pole is available in either four- or six-foot lengths. It provides additional protection on high-voltage circuits and it also provides a means for making measurements on circuits which would otherwise be inaccessible.

VOLTAGE MEASUREMENTS

To measure voltage, proceed as follows:

1. Turn selector knob to proper range.
2. Screw the voltage-lead connectors into the holes beside the selector knob.
3. Clip the other end of the leads to the circuit.
4. Read the instrument.

USE OF POINTER-STOP MECHANISM (AK-4 ONLY)

The operation of the mechanism is as follows:

1. Connect the instrument. Then, select a scale range which results in a momentary deflection well up on the scale.
2. Rotate the red set-screw counterclockwise until the deflection of the pointer from the pointer stop is barely noticeable on repeated application of the measured quantity.
3. Read the instrument.

Note: The red set-screw must be rotated to its maximum clockwise position, when the pointer-stop mechanism is not in use.

The accuracy of such measurements is dependent on the duration of the impulse. The accuracy improves with longer durations.

EXTENDING THE INSTRUMENT RANGES

MEASUREMENT OF LOW CURRENTS

If the pointer deflection is too small for an accurate reading (when using the lowest range) the sensitivity can be increased by passing the conductor two or more times through the hook. To determine the actual

current, divide the instrument reading by the number of times the conductor is passed through the hook.

MEASUREMENT OF HIGH CURRENTS AND VOLTAGES

Currents and voltages above the highest instrument ranges may be measured by using suitable instrument tranformers.

Warning: When this instrument is used with a current or potential transformer, the recognized safety precautions applying to the use of current or potential transformers should be followed. (Ground secondary of both current and potential transformers; and when using a current transformer, do not open the secondary circuit without first short-circuiting the transformer secondary terminals; etc.)

For **current** measurements, connect a jumper across the secondary terminals of a current transformer. Pass this jumper through the instrument hook enough times to obtain a satisfactory deflection of the instrument pointer.

Note: If the instrument-current transformer has a secondary rating of 5 amperes (usually the case): With **Type AK-4** pass the jumper through the instrument hook *twice* and use the 10-ampere range; with **Type AK-5** pass the jumper through the hook *once* and use the 5-ampere range.

To determine the actual value of the line (primary) current, divide the instrument reading by the number of times the jumper is passed through the hook and multiply this result by the transformer ratio.

For **voltage** measurements above 750 volts, connect

the instrument voltage leads to the secondary terminals of a potential transformer. To determine the actual value of the line (primary) voltage, multiply the reading by the transformer ratio.

MAINTENANCE

Keep the tips of the hook clean by wiping occasionally with an oily cloth.

To clean the plastic window, wash it with soap and water. To remove grease or oil, use kerosene sparingly. DO NOT use acetone, benzene, carbon tetrachloride, fire-extinguisher fluids, lacquer thinners, or window sprays containing these solvents, since they will smear and soften the window.

It is recommended that the window be wiped or blotted periodically with a clean damp chamois. Do not rub the window with a dry cloth as this is likely to cause scratches and to build up an undesirable electrostatic charge. Should an electrostatic charge be present at any time it may be removed and further buildup prevented by applying an anti-static agent such as General Electric Specification No. A50W321 very sparingly to the instrument window. Care should be taken not to flood the window since an excessive amount of fluid will cause the window to crack.

If the window becomes scratched due to handling, the scratches may be removed or considerably reduced by applying a good auto-body cleaner. After the scratches are removed, wash off the cleaner and again apply an anti-static agent to the window.

REPAIR SERVICE

Return the instrument to one of the repair centers listed below. If the instrument is returned by mail, pack it carefully, (since damage incurred in shipment is the sender's responsibility) and ship it PREPAID. To prevent damage during shipment USE PLENTY OF PADDING. Attach a tag to the instrument giving your name and complete return address (please print). Mark all packages:

ATTENTION: REPAIR SERVICE

Charges will be in accordance with the extent of the repairs required.

HOOK-ON VOLT-AMMETER REPAIR CENTERS

GENERAL ELECTRIC SERVICE SHOPS

Chicago 32, Illinois	4360 West 47th St.
Denver 5, Colorado	3353 Larimer St.
Philadelphia 24, Pa.	1040 East Erie Ave.
San Francisco 3, Calif.	1098 Harrison St.
Dallas 19, Texas	3202 Manor Way
Cincinnati 2, Ohio	444 West 3rd St.
Pittsburgh 6, Pa.	6519 Penn Ave.
Chamblee, Ga.	4639 Peachtree Industrial Blvd.
North Bergen, N. J.	6001 Tonnelle Ave.
Schenectady, N. Y.	Bldg. 5, 1 River Rd.
Detroit 2, Mich	5950 Third Ave.

OUTSIDE REPAIR CENTERS

Electro-Tech Equipment Co.	
308 Canal St.	N. Y. 13, N. Y.
Christie Laboratories, Inc.	
616 St. Clair Ave., N. E.	Cleveland 14, Ohio
Quality Electric Company	
3700 South Broadway	Los Angeles 7, Calif.
Instrument Laboratory, Inc.	
934 Elliott Ave., West	Seattle, Wash.

OTHER GENERAL ELECTRIC INSTRUMENTS

VOLTS, AMPS, AND WATTS

RECORDING VOLT-AMMETER

The Type CF-7 records a wide range of currents and voltages in a-c circuits. Consisting of a portable recorder and a butyl-molded hook-on transformer, the Type CF-7 can be used on circuits operating at potentials up to 8700 volts. Refer to GEA-6821.

PORTABLE INDICATING INSTRUMENTS

The Type AP-11 and DP-11 high-quality portable instruments are available in a complete line of 0.5% accuracy class (ASA) ammeters, voltmeters, and wattmeters for AC and DC measurements. Refer to Bulletin GEA-7783 or HBK-8103.

MEDIUM-SIZE PORTABLE INDICATING INSTRUMENTS

The Type AP-9 - 0.75% accuracy class and DP-9 - 0.5% accur ...meters, voltmeters, and ... n GEA-7783 or HBK-810...

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INSTRUMENT DEPARTMENT

GENERAL ELECTRIC

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